

Appendix B Glossary

Terms related to evaluation and repair of concrete structures as used herein are defined as follows:

Abrasion resistance

Ability of a surface to resist being worn away by rubbing and friction.

Acrylic resin

One of a group of thermoplastic resins formed by polymerizing the esters or amides of acrylic acid; used in concrete construction as a bonding agent or surface sealer.

Adhesives

The group of materials used to join or bond similar or dissimilar materials; for example, in concrete work, the epoxy resins.

Air-water jet

A high-velocity jet of air and water mixed at the nozzle; used in cleanup of surfaces of rock or concrete such as horizontal construction joints.

Alkali-aggregate reaction

Chemical reaction in mortar or concrete between alkalies (sodium and potassium) from portland cement or other sources and certain constituents of some aggregates; under certain conditions, deleterious expansion of the concrete or mortar may result.

Alkali-carbonate rock reaction

The reaction between the alkalies (sodium and potassium) in portland cement and certain carbonate rocks, particularly calcitic dolomite and dolomitic limestones, present in some aggregates; the products of the reaction may cause abnormal expansion and cracking of concrete in service.

Alkali reactivity (of aggregate)

Susceptibility of aggregate to alkali-aggregate reaction.

Alkali-silica reaction

The reaction between the alkalies (sodium and potassium) in portland cement and certain siliceous rocks or minerals, such as opaline chert and acidic volcanic glass, present in some aggregates; the products of the reaction may cause abnormal expansion and cracking of concrete in service.

Autogenous healing

A natural process of closing and filling of cracks in concrete or mortar when kept damp.

Bacterial corrosion

The destruction of a material by chemical processes brought about by the activity of certain bacteria which may produce substances such as hydrogen sulfide, ammonia, and sulfuric acid.

Blistering

The irregular raising of a thin layer at the surface of placed mortar or concrete during or soon after completion of the finishing operation, or in the case of pipe after spinning; also bulging of the finish plaster coat as it separates and draws away from the base coat.

Bug holes

Small regular or irregular cavities, usually not exceeding 15 mm in diam, resulting from entrapment of air bubbles in the surface of formed concrete during placement and compaction.

Butyl stearate

A colorless oleaginous, practically odorless material ($C_{17}H_{35}COOC_4H_9$) used as an admixture for concrete to provide dampproofing.

Cavitation damage

Pitting of concrete caused by implosion; i.e., the collapse of vapor bubbles in flowing water which form in areas of low pressure and collapse as they enter areas of higher pressure.

Chalking

Formation of a loose powder resulting from the disintegration of the surface of concrete or an applied coating such as cement paint.

Checking

Development of shallow cracks at closely spaced, but irregular, intervals on the surface of plaster, cement paste, mortar, or concrete.

Cold-joint lines

Visible lines on the surfaces of formed concrete indicating the presence of joints where one layer of concrete had hardened before subsequent concrete was placed.

Concrete, preplaced-aggregate

Concrete produced by placing coarse aggregate in a form and later injecting a portland-cement-sand grout, usually with admixtures, to fill the voids.

Corrosion

Destruction of metal by chemical, electrochemical, or electrolytic reaction with its environment.

Cracks, active*

Those cracks for which the mechanism causing the cracking is still at work. Any crack that is still moving.

Cracks, dormant*

Those cracks not currently moving or which the movement is of such magnitude that the repair material will not be affected.

Craze cracks

Fine, random cracks or fissures in a surface of plaster, cement paste, mortar, or concrete.

Crazing

The development of craze cracks; the pattern of craze cracks existing in a surface. (See also Checking.)

Dampproofing

Treatment of concrete or mortar to retard the passage or absorption of water or water vapor, either by application of a suitable coating to exposed surfaces or by use of a suitable admixture, treated cement, or preformed films such as polyethylene sheets under slabs on grade. (See also Vapor barrier.)

D-cracking

A series of cracks in concrete near and roughly parallel to joints, edges, and structural cracks.

Delamination

A separation along a plane parallel to a surface as in the separation of a coating from a substrate or the layers of a coating from each other, or in the case of a concrete slab, a horizontal splitting, cracking, or separation of a slab in a plane roughly parallel to, and generally near, the upper surface; found most frequently in bridge decks and caused by the corrosion of reinforcing steel or freezing and thawing; similar to spalling, scaling, or peeling except that delamination affects large areas and can often be detected only by tapping.

Deterioration

Decomposition of material during testing or exposure to service. (See also Disintegration.)

Diagonal crack

In a flexural member, an inclined crack caused by shear stress, usually at about 45 deg to the neutral axis of a concrete member; a crack in a slab, not parallel to the lateral or longitudinal directions.

Discoloration

Departure of color from that which is normal or desired.

Disintegration

Reduction into small fragments and subsequently into particles.

Dry-mix shotcrete

Shotcrete in which most of the mixing water is added at the nozzle.

Drypacking

Placing of zero slump, or near zero slump, concrete, mortar, or grout by ramming it into a confined space.

Durability

The ability of concrete to resist weathering action, chemical attack, abrasion, and other conditions of service.

Dusting

The development of a powdered material at the surface of hardened concrete.

Efflorescence

A deposit of salts, usually white, formed on a surface, the substance having emerged in solution from within concrete or masonry and subsequently having been precipitated by evaporation.

Epoxy concrete

A mixture of epoxy resin, catalyst, fine aggregate, and coarse aggregate. (See also Epoxy mortar, Epoxy resin, and Polymer concrete.)

Epoxy mortar

A mixture of epoxy resin, catalyst, and fine aggregate. (See also Epoxy resin.)

Epoxy resin

A class of organic chemical bonding systems used in the preparation of special coatings or adhesives for concrete or as binders in epoxy resin mortars and concretes.

* All definitions are in accordance with ACI 116R except those denoted by an asterisk.

Erosion

Progressive disintegration of a solid by the abrasive or cavitation action of gases, fluids, or solids in motion. (See also Abrasion resistance and Cavitation damage.)

Ettringite

A mineral, high-sulfate calcium sulfoaluminate ($3\text{CaO}\cdot\text{Al}_2\text{O}_3\cdot3\text{CaSO}_4\cdot32\text{H}_2\text{O}$) also written as $\text{Ca}_6[\text{Al}(\text{OH})_6]_2\cdot24\text{H}_2\text{O}[(\text{SO}_4)_3\cdot(1-1/2)\text{H}_2\text{O}]$ occurring in nature or formed by sulfate attack on mortar and concrete; the product of the principal expansion-producing reaction in expansive cements; designated as “cement bacillus” in older literature.

Evaluation*

Determining the condition, degree of damage or deterioration, or serviceability and, when appropriate, indicating the need for repair, maintenance, or rehabilitation. (See also Repair, Maintenance, and Rehabilitation.)

Exfoliation

Disintegration occurring by peeling off in successive layers; swelling up and opening into leaves or plates like a partly opened book.

Exudation

A liquid or viscous gel-like material discharge through a pore, crack, or opening in the surface of concrete.

Feather edge

Edge of a concrete or mortar patch or topping that is beveled at an acute angle.

Groove joint

A joint created by forming a groove in the surface of a pavement, floor slab, or wall to control random cracking.

Hairline cracks

Cracks in an exposed concrete surface having widths so small as to be barely perceptible.

Honeycomb

Voids left in concrete due to failure of the mortar to effectively fill the spaces among coarse aggregate particles.

Incrustation

A crust or coating, generally hard, formed on the surface

of concrete or masonry construction or on aggregate particles.

Joint filler

Compressible material used to fill a joint to prevent the infiltration of debris and to provide support for sealants.

Joint sealant

Compressible material used to exclude water and solid foreign material from joints.

Laitance

A layer of weak and nondurable material containing cement and fines from aggregates, brought by bleeding water to the top of overwet concrete, the amount of which is generally increased by overworking or overmanipulating concrete at the surface by improper finishing or by job traffic.

Latex

A water emulsion of a high molecular-weight polymer used especially in coatings, adhesives, and leveling and patching compounds.

Maintenance*

Taking periodic actions that will prevent or delay damage or deterioration or both. (See also Repair.)

Map cracking

See Cracking.

Microcracks

Microscopic cracks within concrete.

Monomer

An organic liquid of relatively low molecular weight that creates a solid polymer by reacting with itself or other compounds of low molecular weight or with both.

Overlay

A layer of concrete or mortar, seldom thinner than 25 mm (1 in.), placed on and usually bonded onto the worn or cracked surface of a concrete slab to restore or improve the function of the previous surface.

Pattern cracking

Intersecting cracks that extend below the surface of hardened concrete; caused by shrinkage of the drying surface which is restrained by concrete at greater depth where little or no shrinkage occurs; vary in width and depth from fine and barely visible to open and well defined.

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Peeling

A process in which thin flakes of mortar are broken away from a concrete surface, such as by deterioration or by adherence of surface mortar to forms as forms are removed.

Pitting

Development of relatively small cavities in a surface caused by phenomena such as corrosion or cavitation, or in concrete localized disintegration such as a popout.

Plastic cracking

Cracking that occurs in the surface of fresh concrete soon after it is placed and while it is still plastic.

Plastic shrinkage cracks

See Plastic cracking.

Polyester

One of a large group of synthetic resins, mainly produced by reaction of dibasic acids with dihydroxy alcohols, commonly prepared for application by mixing with a vinyl-group monomer and free-radical catalyst at ambient temperatures and used as binders for resin mortars and concretes, fiber laminates (mainly glass), adhesives, and the like. (See also Polymer concrete.)

Polyethylene

A thermoplastic high-molecular-weight organic compound used in formulating protective coatings; in sheet form, used as a protective cover for concrete surfaces during the curing period, or to provide a temporary enclosure for construction operations.

Polymer

The product of polymerization; more commonly, a rubber or resin consisting of large molecules formed by polymerization.

Polymer concrete

Concrete in which an organic polymer serves as the binder; also known as resin concrete; sometimes erroneously employed to designate hydraulic-cement mortars or concretes in which part or all of the mixing water is replaced by an aqueous dispersion of a thermoplastic copolymer.

Polymer-cement concrete

A mixture of water, hydraulic cement, aggregate, and a monomer or polymer polymerized in place when a monomer is used.

Polymerization

The reaction in which two or more molecules of the same substance combine to form a compound containing the same elements in the same proportions, but of higher molecular weight, from which the original substance can be generated, in some cases only with extreme difficulty.

Polystyrene resin

Synthetic resins varying in color from colorless to yellow formed by the polymerization of styrene, or heated, with or without catalysts, that may be used in paints for concrete or for making sculptured molds or as insulation.

Polysulfide coating

A protective coating system prepared by polymerizing a chlorinated alkylpolyether with an inorganic polysulfide.

Polyurethane

Reaction product of an isocyanate with any of a wide variety of other compounds containing an active hydrogen group; used to formulate tough, abrasion-resistant coatings.

Polyvinyl acetate

Colorless, permanently thermoplastic resin, usually supplied as an emulsion or water-dispersible powder characterized by flexibility, stability toward light, transparency to ultraviolet rays, high dielectric strength, toughness, and hardness; the higher the degree of polymerization, the higher the softening temperature; may be used in paints for concrete.

Polyvinyl chloride

A synthetic resin prepared by the polymerization of vinyl chloride; used in the manufacture of nonmetallic water-stops for concrete.

Popout

The breaking away of small portions of concrete surface due to internal pressure, which leaves a shallow, typically conical, depression.

Pot life

Time interval after preparation during which a liquid or plastic mixture is usable.

Reactive aggregate

Aggregate containing substances capable of reacting chemically with the products of solution or hydration of the portland cement in concrete or mortar under ordinary

conditions of exposure, resulting in some cases in harmful expansion, cracking, or staining.

Rebound hammer

An apparatus that provides a rapid indication of the mechanical properties of concrete based on the distance of rebound of a spring-driven missile.

Rehabilitation

The process of repairing or modifying a structure to a desired useful condition.

Repair

Replace or correct deteriorated, damaged, or faulty materials, components, or elements of a structure.

Resin

A natural or synthetic, solid or semisolid organic material of indefinite and often high molecular weight having a tendency to flow under stress that usually has a softening or melting range and usually fractures conchoidally.

Resin mortar (or concrete)

See Polymer concrete.

Restraint (of concrete)

Restriction of free movement of fresh or hardened concrete following completion of placement in formwork or molds or within an otherwise confined space; restraint can be internal or external and may act in one or more directions.

Rock pocket

A porous, mortar-deficient portion of hardened concrete consisting primarily of coarse aggregate and open voids, caused by leakage of mortar from form, separation (segregation) during placement, or insufficient consolidation. (See also Honeycombing.)

Sandblasting

A system of cutting or abrading a surface such as concrete by a stream of sand ejected from a nozzle at high speed by compressed air; often used for cleanup of horizontal construction joints or for exposure of aggregate in architectural concrete.

Sand streak

A streak of exposed fine aggregate in the surface of formed concrete that is caused by bleeding.

Scaling

Local flaking or peeling away of the near-surface portion of hardened concrete or mortar; also of a layer from

metal. (See also Peeling and Spalling.) (Note: Light scaling of concrete does not expose coarse aggregate; medium scaling involves loss of surface mortar to 5 to 10 mm in depth and exposure of coarse aggregate; severe scaling involves loss of surface mortar to 5 to 10 mm in depth with some loss of mortar surrounding aggregate particles 10 to 20 mm in depth; very severe scaling involves loss of coarse-aggregate particles as well as mortar generally to a depth greater than 20 mm.)

Shotcrete

Mortar or concrete pneumatically projected at high velocity onto a surface; also known as air-blown mortar; also pneumatically applied mortar or concrete, sprayed mortar, and gunned concrete. (See also Dry-mix shotcrete and Wet-mix shotcrete.)

Shrinkage

Volume decrease caused by drying and chemical changes; a function of time but not temperature or of stress caused by external load.

Shrinkage crack

Crack due to restraint of shrinkage.

Shrinkage cracking

Cracking of a structure or member from failure in tension caused by external or internal restraints as reduction in moisture content develops or as carbonation occurs, or both.

Spall

A fragment, usually in the shape of a flake, detached from a larger mass by a blow, action of weather, pressure, or expansion within the larger mass; a small spall involves a roughly circular depression not greater than 20 mm in depth nor 150 mm in any dimension; a large spall may be roughly circular or oval or, in some cases, elongated more than 20 mm in depth and 150 mm in greatest dimension.

Stalactite

A downward-pointing deposit formed as an accretion of mineral matter produced by evaporation of dripping water from the surface of concrete, commonly shaped like an icicle.

Stalagmite

An upward-pointing deposit formed as an accretion of mineral matter produced by evaporation of dripping water, projecting from the surface of concrete, and commonly conical in shape.

Spalling

The development of spalls.

Sulfate attack

Chemical or physical reaction, or both, between sulfates, usually in soil or ground water and concrete or mortar, primarily with calcium aluminate hydrates in the cement-paste matrix, often causing deterioration.

Sulfate resistance

Ability of concrete or mortar to withstand sulfate attack. (See also Sulfate attack.)

Swiss hammer

See Rebound hammer.

Temperature cracking

Cracking as a result of tensile failure caused by temperature drop in members subjected to external restraints or temperature differential in members subjected to internal restraints.

Thermal shock

The subjection of newly hardened concrete to a rapid change in temperature which may be expected to have a potentially deleterious effect.

Thermoplastic

Becoming soft when heated and hard when cooled.

Thermosetting

Becoming rigid by chemical reaction and not remeltable.

Transverse cracks

Cracks that develop at right angles to the long direction of a member.

Tremie

A pipe or tube through which concrete is deposited underwater, having at its upper end a hopper for filling and a bail for moving the assemblage.

Tremie concrete

Subaqueous concrete placed by means of a tremie.

Tremie seal

The depth to which the discharge end of the tremie pipe is kept embedded in the fresh concrete that is being placed; a layer of tremie concrete placed in a cofferdam for the purpose of preventing the intrusion of water when the cofferdam is dewatered.

Vapor barrier

A membrane placed under concrete floor slabs that are placed on grade and intended to retard transmission of water vapor.

Waterstop

A thin sheet of metal, rubber, plastic, or other material inserted across a joint to obstruct seepage of water through the joint.

Water void

Void along the underside of an aggregate particle or reinforcing steel which formed during the bleeding period and initially filled with bleed water.

Weathering

Changes in color, texture, strength, chemical composition, or other properties of a natural or artificial material caused by the action of the weather.

Wet-mix shotcrete

Shotcrete in which the ingredients, including mixing water, are mixed before introduction into the delivery hose; accelerator if used, is normally added at the nozzle.